

AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. LITTLE, in Charge]

By L. T. SAMUELS

An airplane observation station was established at El Paso, Tex., on July 1.

At those stations with a sufficient period of record for the determination of approximate normals, upper-air temperatures during July averaged close to normal. (See table 1 and footnote thereon.) Upper-air relative humidities averaged slightly above normal in most cases.

The resultant winds for the month were, in general, as follows: At 2,000 meters, the directions were generally

close to normal, and the velocities mostly above normal. At 5,000 meters, the directions were close to normal at most stations except Albuquerque and Oklahoma City, where a pronounced southerly component prevailed as compared to the normal northerly component. The velocities were mostly above normal over the southern half of the country, and below normal over the northern half, particularly Chicago and Spokane, where the departures exceeded 3 meters per second.

TABLE 1.—*Mean free-air temperatures and relative humidities obtained by airplanes during July 1935*

TEMPERATURE (° C)

Stations	Altitude (meters) m. s. l.												Number of observations						
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000		
Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal		
Barksdale, La. ¹ (52 m.)	24.4	.....	25.8	.....	22.7	.....	19.3	.....	16.5	.....	13.7	.....	10.9	.....	5.2	.....	-1.0	.....
Billings, Mont. ¹ (1088 m.)	18.4	.....	.....	.....	20.8	.....	18.9	.....	15.6	.....	12.6	.....	5.4	.....	-2.6	.....	31		
Cheyenne, Wyo. ² (1,873 m.)	15.5	.....	.....	.....	.....	.....	17.8	.....	18.1	.....	14.8	.....	6.8	.....	-1.6	.....	30		
El Paso ² (1,194 m.)	24.7	.....	.....	.....	25.5	.....	22.7	.....	19.3	.....	15.5	.....	7.2	.....	-0.5	.....	30		
Fargo, N. Dak. ² (274 m.)	19.4	.....	21.8	.....	22.4	.....	20.1	.....	17.3	.....	13.9	.....	10.3	.....	3.1	.....	-4.5	.....	31
Kelly Field (San Antonio), Tex. ¹ (206 m.)	23.3	.....	24.5	.....	22.5	.....	19.6	.....	16.4	.....	13.3	.....	10.5	.....	4.5	.....	-1.7	.....	31
Lakehurst, N. J. ³ (39 m.)	21.1	.....	21.4	.....	18.8	.....	16.0	.....	13.5	.....	11.0	.....	8.5	.....	3.3	.....	-2.0	.....	31
Maxwell Field (Montgomery), Ala. ¹ (52 m.)	24.4	.....	24.5	.....	22.0	.....	18.5	.....	15.3	.....	12.8	.....	10.0	.....	4.4	.....	-1.4	.....	29
Mitchel Field (Hempstead, L. I.), N. Y. ¹ (29 m.)	20.7	.....	21.5	.....	19.0	.....	16.0	.....	13.0	.....	10.8	.....	8.2	.....	2.3	.....	-3.4	.....	29
Murfreesboro, Tenn. ² (174 m.)	21.9	.....	23.9	.....	20.7	.....	17.1	.....	14.1	.....	11.5	.....	5.4	.....	2.6	.....	-3.7	.....	31
Norfolk, Va. ³ (10 m.)	23.5	-1.2	22.7	-1.0	20.9	-0.7	18.5	-0.4	16.2	+0.4	13.9	+0.8	11.4	+1.0	5.7	+1.1	0.4	+1.5	29
Oklahoma City, Okla. ² (391 m.)	23.5	.....	25.2	.....	25.0	.....	21.5	.....	18.1	.....	14.9	.....	11.5	.....	4.6	.....	-1.3	.....	30
Omaha, Nebr. ² (360 m.)	23.6	+1.2	25.6	+1.6	26.0	+1.0	22.9	+0.7	19.6	+0.5	16.1	+0.6	12.5	+0.7	5.2	+0.8	-1.7	+0.9	31
Pearl Harbor, Territory of Hawaii ³ (6 m.)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pensacola, Fla. ³ (24 m.)	25.0	-0.9	24.0	-0.3	20.7	-0.9	17.3	-1.2	14.2	-1.2	11.4	-1.0	8.4	-1.0	2.5	-1.0	-2.7	-0.4	31
San Diego, Calif. ³ (10 m.)	17.9	-2.6	17.0	-1.2	21.7	-0.4	21.8	-0.4	20.1	-1.1	17.7	-1.4	14.5	-2.3	7.7	-2.0	0.3	-2.4	31
Scott Field (Belleville), Ill. ¹ (135 m.)	21.5	.....	25.5	.....	22.8	.....	19.9	.....	17.2	.....	14.2	.....	11.2	.....	4.9	.....	-1.0	.....	30
Seattle, Wash. ³ (25 m.)	13.4	-2.8	12.9	-0.8	12.6	-0.1	10.7	-0.2	8.8	-0.2	6.7	-0.1	4.7	+0.2	-0.8	+0.3	-6.9	+0.3	30
Selfridge Field (Mount Clemens), Mich. ¹ (177 m.)	20.2	.....	22.1	.....	19.7	.....	16.4	.....	13.1	.....	10.2	.....	7.4	.....	1.1	.....	-4.8	.....	31
Spokane, Wash. ² (596 m.)	15.1	.....	18.8	.....	17.8	.....	14.4	.....	10.5	.....	6.9	.....	0.3	.....	-7.1	.....	-1.4	.....	31
Sunnyvale, Calif. ⁴ (10 m.)	16.6	-0.6	15.4	-0.2	18.3	-0.4	18.8	-1.2	16.4	-1.6	13.0	-1.9	9.6	-2.0	2.7	-1.4	-5.0	-1.4	20
Washington, D. C. ⁴ (13 m.)	22.3	-1.7	22.6	+0.3	20.1	-0.2	17.2	-0.4	14.5	-0.3	11.7	-0.2	9.1	0.0	4.2	+0.7	-1.0	+1.4	31
Wright Field (Dayton), Ohio ¹ (244 m.)	19.8	.....	22.4	.....	21.0	.....	17.7	.....	14.6	.....	11.8	.....	9.4	.....	3.9	.....	-2.1	.....	30

RELATIVE HUMIDITY (PERCENT)

Barksdale, La.	88	63	67	70	65	59	57	51	46
Billings, Mont.	59	.....	45	41	44	44	42	47	47
Cheyenne, Wyo.	66	.....	.....	59	47	46	51	60	60
El Paso, Tex.	45	.....	.....	44	44	46	51	65	68
Fargo, N. Dak.	88	72	61	56	50	47	49	46	43
Kelly Field (San Antonio), Tex.	91	80	69	67	68	62	55	49	51
Lakehurst, N. J.	90	74	75	77	71	68	66	60	50
Maxwell Field (Montgomery), Ala.	87	73	70	77	77	67	65	62	53
Mitchel Field (Hempstead, L. I.), N. Y.	92	73	71	74	72	64	59	56	53
Murfreesboro, Tenn.	89	68	72	77	69	61	60	51	46
Norfolk, Va.	86	+6	83	+10	78	+8	70	+6	+6
Oklahoma City, Okla.	82	73	62	63	62	57	56	58	52
Omaha, Nebr.	82	+5	69	+2	55	+2	51	+2	-4
Pensacola, Fla.	89	+3	81	+1	80	+4	77	+6	+5
San Diego, Calif.	88	+10	85	+4	52	+1	40	0	-11
Scott Field (Belleville), Ill.	93	65	68	65	61	59	55	54	52
Seattle, Wash.	85	+9	81	+3	73	0	70	+2	+4
Selfridge Field (Mount Clemens), Mich.	86	66	66	69	71	63	57	53	42
Spokane, Wash.	65	51	47	49	53	55	59	52	52
Sunnyvale, Calif.	74	0	73	-1	55	+2	39	+9	+9
Washington, D. C.	89	+14	70	+2	71	+7	74	+9	+8
Wright Field (Dayton), Ohio.	91	75	71	72	67	59	53	45	41

¹ Army.² Weather Bureau.³ Navy.

TABLE 1.—*Mean free-air temperatures and relative humidities obtained by airplanes during July 1935—Continued*

TEMPERATURE (° C.)

[Late reports for May 1935]

Stations	Altitude (meters) m. s. l.																Number of observations		
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000				
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal			
Pearl Harbor, Territory of Hawaii ³ (6 m.)	21.8	-3.9	20.2	-1.5	17.1	-0.7	14.3	-0.7	13.6	+0.8	13.1	+1.3	11.3	+1.0	5.9	+0.1	0.3	+0.1	31

RELATIVE HUMIDITY (PERCENT)

Pearl Harbor, Territory of Hawaii	80	+14	79	+6	83	+3	81	+5	59	-8	36	-13	27	-9	21	-3	19	-3	-----
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TEMPERATURE (° C.)

[Late reports for June 1935]

Pearl Harbor, Territory of Hawaii	22.9	-2.8	21.1	-1.1	18.3	-0.2	15.5	-0.3	13.8	+0.4	12.5	+0.5	10.7	+0.3	6.4	-0.2	1.7	+0.1	30
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RELATIVE HUMIDITY (PERCENT)

Pearl Harbor, Territory of Hawaii	78	+9	78	+3	81	0	79	+1	67	-5	49	-7	37	-4	24	+1	20	+4	-----
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³ Navy.

Observations taken about 4 a. m., 75th meridian time, except along the Pacific coast and Hawaii where they are taken at dawn.

NOTE.—The departures are based on "normals" covering the following number of observations made during the same month in previous years, including the current year: Norfolk, 149; Omaha, 90; Pensacola, 180; San Diego, 166; Seattle, 56; Sunnyvale, 47; Washington, 222; Pearl Harbor (May), 108; Pearl Harbor (June), 110.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 5 a. m. (E. S. T.) during July 1935*
[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m.)	Atlanta, Ga. (309 m.)	Billing ^s , Mont. (1,088 m.)	Boston, Mass. (15 m.)	Cheyenne, Wyo. (1,873 m.)	Chicago, Ill. (192 m.)	Cincinnati, Ohio (153 m.)	Detroit, Mich. (204 m.)	Fargo, N. Dak. (274 m.)	Houston, Tex. (21 m.)	Key West, Fla. (11 m.)	Medford, Oreg. (410 m.)	Murfreesboro, Tenn. (180 m.)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	°	0.9	316	0.2	352	1.7	263	1.5	274	2.3	230	1.0	37	0.3
500	252	0.4	299	5.8	301	4.6	279	4.5	290	3.3	266	2.8	268	2.4
1,000	228	0.8	117	3.6	284	5.5	280	3.3	290	4.0	281	4.9	185	3.6
1,500	166	2.5	132	3.3	281	7.4	245	3.1	281	4.9	188	4.4	289	4.8
2,000	184	3.0	207	2.5	285	8.3	211	3.8	287	4.5	290	4.1	271	5.4
2,500	198	3.2	249	4.8	292	8.8	229	4.2	287	5.1	295	4.5	272	6.0
3,000	214	1.6	319	1.7	247	8.3	292	10.2	304	4.9	301	5.0	285	6.0
4,000	196	1.9	306	2.8	249	10.6	268	3.1	302	6.5	292	6.5	84	3.1
5,000														
Altitude (m) m. s. l.	Newark, N. J. (14 m.)	Oakland, Calif. (8 m.)	Oklahoma City, Okla. (402 m.)	Omaha, Nebr. (306 m.)	Pearl Harbor, Territory of Hawaii ¹ (68 m.)	Pensacola, Fla. ¹ (24 m.)	St. Louis, Mo. (170 m.)	Salt Lake City, Utah (1,294 m.)	San Diego, Calif. (15 m.)	Sault Ste. Marie, Mich. (198 m.)	Seattle, Wash. (14 m.)	Spokane, Wash. (603 m.)	Washington, D. C. (10 m.)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	°	0.6	317	1.2	173	3.4	165	2.2	°	0.9	254	0.9	162	4.7
500	293	4.2	245	2.2	183	6.6	195	8.2	76	0.4	246	3.3	14	0.4
1,000	278	6.1	322	3.4	198	10.6	221	10.2	225	0.6	276	3.2	339	2.2
1,500	277	6.8	288	1.7	202	7.4	236	9.1	192	1.6	299	4.1	172	8.1
2,000	280	8.0	272	2.1	201	4.0	242	5.5	184	1.4	321	4.9	180	8.0
2,500	272	8.7	258	2.2	187	2.7	245	4.1	258	0.9	326	4.6	109	1.2
3,000	283	7.0	248	4.8	147	3.1	258	4.1	304	1.1	332	4.5	216	6.0
4,000					115	3.8	307	4.5	46	0.7			220	5.8
5,000					156	2.4					218	5.8	156	0.2

¹ Navy stations.